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Country-level drivers of biodiversity disclosures: international evidence and policy implications

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ABSTRACT

Biodiversity loss and species extinction represent urgent global policy issues, exerting substantial pressure on organisations to address these challenges. Multinational Enterprises (MNEs) are increasingly incorporating biodiversity protection efforts into their reporting frameworks. Despite this trend, the external governance mechanisms driving such disclosures remain underexplored. This study examines the influence of a country's legal system, level of corruption, and cultural background on MNEs' biodiversity and species extinction disclosures from an international perspective. Utilising a sample of the top 200 Fortune Global MNEs over a five-year period and drawing on institutional and legitimacy theories, we find that MNEs headquartered in countries with weaker legal systems and higher corruption levels provide more extensive biodiversity disclosures. Additionally, national culture is identified as a critical determinant of biodiversity disclosure. Our analysis also reveals that macroeconomic uncertainty significantly moderates these disclosures. Furthermore, the introduction of the United Nations Sustainable Development Goals in 2015 is shown to impact disclosure practices. These findings challenge the prevailing assumption that MNEs in stronger institutional environments are more responsive to external pressures. This study provides the first empirical evidence that external governance mechanisms and macroeconomic factors significantly influence biodiversity disclosures. The results, robust across alternative measures and sub-sample analyses, highlight the necessity of robust legal systems, anti-corruption initiatives, cultural sensitivity, and economic stability in achieving global biodiversity targets. These insights bear significant implications for regulators and policymakers, emphasising the need for comprehensive institutional support to enhance biodiversity protection efforts.

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1. Introduction

The alarming decline in biodiversity has emerged as a critical global risk and urgent policy issue, with recent reports highlighting unprecedented rates of species extinction (World Economic Forum, 2022). This decline, vital for maintaining ecosystem balance and societal welfare, is primarily driven by commercial overexploitation, significantly endangering various species. The wildlife trade exacerbates this threat, with biodiversity underpinning essential industries such as food, medicine, fashion, construction, culture, and recreation (Andersson et al., 2021). In light of these challenges, this research aims to investigate how external governance mechanisms, such as national legal systems, levels of corruption, and cultural backgrounds, influence biodiversity and species extinction disclosures¹ by Multinational Enterprises (MNEs). Additionally, the study examines whether the introduction of the United Nations Sustainable Development Goals (SDGs) and macroeconomic policies moderate these relationships.

Recognising the critical importance of biodiversity, MNEs are increasingly aware that its continued decline poses severe risks not only to societal well-being but also to sustainable organisational development and the stability of entire supply chains (Atkins et al., 2022; Jones, 2019). In response, several global policies and regulations have been implemented to address biodiversity loss, reflecting a collective commitment to preserving nature. Notably, the Kunming-Montreal Global Biodiversity Framework (COP 15) established targets to ensure sustainable, safe, and legal wildlife trade (CBD, 2022). Additionally, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) plays a crucial role in legislating international wildlife trade to protect endangered species. Furthermore, the SDGs include specific targets aimed at conserving biodiversity and promoting the sustainable use of ecosystems. Despite these coordinated global efforts, biodiversity continues to decline at an alarming rate.

Theoretical perspectives, particularly institutional and legitimacy theories, offer valuable insights into the motivations behind corporate disclosures. Institutional theory posits that organisations conform to the rules and norms of the institutional environment to gain legitimacy, stability, and survival (DiMaggio & Powell, 1983). Legitimacy theory, on the other hand, suggests that organisations disclose information to legitimize their actions in the eyes of stakeholders and to align with societal expectations (Suchman, 1995). Despite the extensive application of these theories in corporate social responsibility (CSR) and environmental, social, and governance (ESG) studies, there remains a significant gap in understanding how these theoretical frameworks explain biodiversity disclosures. Specifically, the role of national-level institutional characteristics, such as legal systems and corruption levels, and cultural factors in driving biodiversity disclosures is underexplored. Additionally, the moderating effects of macroeconomic policies and the introduction of SDGs on these disclosures have not been thoroughly examined. This study addresses these theoretical gaps by empirically investigating the influence of these factors on biodiversity disclosures by MNEs.

As organisations increasingly acknowledge the biodiversity crisis, they are beginning to disclose their efforts to protect and restore nature. Numerous studies have explored the firm-level determinants motivating MNEs to provide biodiversity disclosures (e.g. Addison et al., 2018; Bhattacharyya & Yang, 2019). However, the role of national-level

¹In this study, biodiversity disclosures refer to both biodiversity and species extinction disclosures.

institutional characteristics in driving biodiversity disclosures remains underexplored. This study examines whether national legal systems, levels of corruption, and cultural backgrounds influence biodiversity disclosures. Additionally, we investigate whether the introduction of the SDGs and macroeconomic policies moderate these relationships. The outcomes of this research have significant policy implications for stakeholders concerned with stabilising the biodiversity crisis and the global economy.

The broader literature on corporate social responsibility (CSR) and environmental, social, and governance (ESG) demonstrates that external governance mechanisms, such as an institution's legal framework, level of corruption, and national culture, significantly impact a firm's disclosure practices (e.g. Baldini et al., 2018; Elamer et al., 2017; Garcia-Sanchez et al., 2013). The examination of legal systems and levels of corruption is particularly crucial in the context of biodiversity disclosures due to increasing regulatory demands from international non-government organisations (NGOs). The prominence of the wildlife trade as a global policy issue stems from international commercial overexploitation. Strong legal systems and low corruption are essential for effectively regulating trade and protecting biodiversity. Corruption undermines good governance, the rule of law, and societal well-being, thereby threatening species with extinction (Zain, 2020). In developing countries, which host 60% to 70% of the world's biodiversity, corruption facilitates illegal activities such as poaching and illicit trading, which are low risk and highly profitable for organised crime (Skouloudis et al., 2019). Moreover, the recent COVID-19 pandemic has highlighted the risks posed by the illegal wildlife trade, including the spillover of zoonotic diseases (Ceballos et al., 2020). The accounting literature underscores the importance of corporate disclosures in combating corruption and maintaining strong institutions, as evidenced by research on audit effects and sustainability reporting (Barkemeyer et al., 2015). Given this context, it is imperative to explore the role of legal frameworks and corruption levels in biodiversity disclosures.

The MNEs in our study are headquartered in countries that are signatories to CITES, an international agreement aimed at preventing wildlife decline through regulated trade. Signatory countries are expected to implement CITES provisions through national legislation, with non-compliance potentially resulting in trade suspensions (CITES, 2024). Despite being CITES signatories and the development of policies by the United Nations General Assembly, the G20 summit, and COP 15 urging member states to address wildlife trade-related corruption, illegal activities remain a global concern, highlighting the need for robust legal systems and effective enforcement to safeguard biodiversity.

Culture is a fundamental antecedent of differences between individuals and firms from diverse cultural backgrounds (Hofstede, 2011). Existing literature indicates that cultural background significantly influences firms' non-financial disclosures (e.g. Baldini et al., 2018; Garcia-Sanchez et al., 2013; Lu & Wang, 2021). National cultural systems exhibit variations that translate into diverse values and beliefs impacting businesses, societies, and governments (Baldini et al., 2018). Despite this, there is a noticeable gap in the literature exploring the influence of culture on biodiversity disclosures. To bridge this gap, we adopt Hofstede's (2011) cultural dimensions, renowned for their efficacy in capturing cultural differences. Hofstede's model is considered the most comprehensive and concise approach for assessing cultural effects, facilitating effective cross-cultural comparisons (Galariotis & Karagiannis, 2021; Tang & Koveos, 2008). Accordingly, we aim to gain novel insights into why firms may prioritise or neglect biodiversity disclosures.

This study investigates MNEs using a cross-country panel dataset, focusing on a sample of 200 Fortune Global firms over five years. To gain an understanding of the complex relationship between MNEs' biodiversity disclosures and external governance influences, we examine the legal system, level of corruption, and cultural dimensions of the firms' headquarters. These relationships are analyzed through legitimacy and institutional perspectives, highlighting the association with social and institutional pressures and the need to maintain legitimacy.

The novelty of this study lies in several key aspects. First, it addresses a significant gap in research by empirically examining how national legal systems, levels of corruption, and national culture affect MNEs' biodiversity disclosures, building on existing literature (e.g. Atkins et al., 2018; Maroun & Atkins, 2018). Furthermore, we uniquely consider how macroeconomic factors, such as economic policy uncertainty and the introduction of the SDGs in 2015, moderate this role. Second, aligning with COP 15 directives that emphasise integrating biodiversity considerations into policy-making processes (CBD, 2022), this study exclusively focuses on biodiversity disclosures, distinguishing itself from traditional CSR studies. Biodiversity disclosures specifically highlight MNEs' impacts on biodiversity and how they manage biodiversity-related risks, which is distinctly different from the broader scope of CSR encompassing social, environmental, and economic impacts.

Third, instead of using the Global Reporting Initiative (GRI) biodiversity framework, this study adopts the more comprehensive framework recommended by Hassan et al. (2020). This framework captures extensive biodiversity disclosures that the GRI framework omits, providing a more detailed analysis. Methodologically, this study ranks quantitative biodiversity disclosure more highly, an approach employed in wider environmental research (Patten, 2002; Wiseman, 1982) as quantitative disclosures have the ability to produce reliable, comparable results across organisations and time periods, aligning with the need for measurable science-based targets (CBD, 2022; Dasgupta, 2021; WWF, 2021). Fifth, this study enriches the limited empirical research on legitimacy and institutional theory by examining the dynamic interplay between biodiversity disclosures and macroeconomic policy, bridging theoretical concepts with practical policy implications. The evidence from this study can influence future biodiversity reporting and assist policymakers, regulators, and decision-makers in aligning with the SDGs and global strategies. Recognising the biodiversity and extinction crisis as one of society's greatest challenges in the coming decade (Dasgupta, 2021; WEF, 2022), this research provides valuable insights for addressing this urgent issue.

The remainder of this paper is structured as follows: Section 2 presents the theoretical framework. Section 3 provides the literature review and hypotheses development. Section 4 describes the data and research design. Section 5 reports the main results and robustness tests. Finally, Section 6 concludes the study.

2. Theoretical framework

The exploration of country and firm-level determinants of biodiversity disclosures benefits from integrating both legitimacy and institutional theoretical perspectives, which are complementary in understanding complex social phenomena (Baldini et al., 2018). Prior research frequently employs legitimacy theory to explain how firms use disclosures to demonstrate adherence to societal norms and constraints, thereby securing

their social license to operate (Bhattacharyya & Yang, 2019; Rimmel & Jonäll, 2013). Specifically, firms with poor environmental records often resort to voluntary disclosures to mitigate negative perceptions and reassure stakeholders (Baldini et al., 2018; Lu & Wang, 2021). Legitimacy theory posits that higher risks of negative social perceptions intensify efforts to maintain or restore legitimacy (Gaia & Jones, 2019), driving firms to provide more comprehensive disclosures (Rimmel & Jonäll, 2013).

Institutional theory, on the other hand, explains the broader mechanisms, pressures, and practices that organisations navigate to achieve conformity with regulatory, cultural, and societal expectations (DiMaggio & Powell, 1983). It posits that firms respond to coercive pressures (e.g. laws and regulations), normative pressures (e.g. professional norms), and mimetic pressures (e.g. emulating successful peers) to gain legitimacy and stability (Gerged et al., 2020; Haque & Jones, 2020). This theory emphasises the importance of the institutional context, including political and societal influences, on corporate behaviour (Deegan, 2002; Haque & Ntim, 2018). For example, the effectiveness of global efforts to curb biodiversity loss can be enhanced by integrating robust regulatory frameworks and international initiatives, such as the EU Taxonomy's Environmental Objective 6 and the SFDR's Principle Adverse Impact (PAI) indicators, particularly PAI 7, which require disclosures on activities negatively affecting biodiversity-sensitive areas (Garel et al., 2024).

The integration of these theories provides a robust framework for understanding biodiversity disclosures. Institutional theory helps explain how MNEs respond to formal and informal pressures, while legitimacy theory addresses the motives behind these disclosures, emphasising reputation management and public perception (Gray et al., 1995). This multi-theoretical approach is essential for capturing the complexities of biodiversity disclosures (Gaia & Jones, 2019; Haque & Jones, 2020).

Our blend of these theories is further buttressed by the argument that while firms symbolically respond to institutional pressures, they simultaneously employ legitimacy strategies to sculpt and maintain a positive image (Talbot & Boiral, 2021). Hence, in our pursuit of a thorough analysis of biodiversity disclosures, intertwining these theories offers a more nuanced and holistic understanding.

Several studies have applied institutional theory to environmental and biodiversity contexts, illustrating how firms comply with institutional rules and expectations to uphold corporate legitimacy (Baldini et al., 2018; Haque & Jones, 2020; Weir, 2019). DiMaggio and Powell's (1983) concept of institutional isomorphism—coercive, mimetic, and normative pressures—provides valuable insights into how firms conform to institutional pressures to maintain legitimacy. Coercive isomorphism occurs when firms adhere to regulations, laws, and power structures (Gerged et al., 2020; Haque & Jones, 2020). Normative isomorphism involves aligning practices with the values of professional and trade associations, influencing corporate policies (DiMaggio & Powell, 1983; Haque & Jones, 2020). Mimetic isomorphism describes how firms imitate competitors in response to uncertainty (Gerged et al., 2020). Together, these pressures shape corporate behaviours and disclosures.

Institutional theory asserts that corporate entities are influenced by regulations, organisational norms, and societal expectations that monitor and shape behaviour (DiMaggio & Powell, 1983). Firms must navigate these influences, incorporating sustainable strategies to meet regulatory and policy requirements and ensure legitimacy (Haque & Ntim, 2018). Empirical evidence suggests that institutional pressures significantly drive

biodiversity disclosures, as seen in studies of local authorities in the UK (Gaia & Jones, 2019) and European firms responding to the EU2020 Biodiversity Strategy (Haque & Jones, 2020).

The literature indicates that sustainability reporting serves both as a symbolic response to institutional pressures and as a legitimising strategy to enhance corporate image (Cho et al., 2015a; Talbot & Boiral, 2021). Baldini et al. (2018) found that country-level factors, including legal and cultural aspects, significantly impact ESG disclosures, supporting the claims of institutional theory. They suggest that biodiversity initiatives are driven by the need to legitimize corporate operations amidst institutional pressures.

By integrating institutional and legitimacy theories, this study offers a nuanced understanding of the drivers of biodiversity disclosures by MNEs. This theoretical approach allows for a deeper exploration of how national legal systems, corruption levels, and cultural contexts influence corporate behaviour, and how macroeconomic policies and the introduction of SDGs moderate these relationships.

3. Literature review and hypotheses development

3.1. Legal system

The existing literature indicates that country-level legal systems significantly influence CSR disclosures and environmental performance (Prado-Lorenzo & Garcia-Sanchez, 2010). Institutional theory posits that MNEs in countries with robust legal enforcement are subjected to greater compliance, monitoring, regulation, and stakeholder scrutiny, leading to higher levels of disclosure (Lu & Wang, 2021). Strong legal enforcement is expected to curb illegal behaviour and safeguard stakeholder interests (La Porta et al., 1998). By integrating robust regulatory frameworks and international initiatives, such as the EU Taxonomy's Environmental Objective 6 and the SFDR's Principle Adverse Impact (PAI) indicators, particularly PAI 7, which require disclosures on activities negatively affecting biodiversity-sensitive areas, the effectiveness of global efforts to curb biodiversity loss can be enhanced. The continued deterioration of biodiversity despite these measures highlights the urgency for more stringent and effective implementation of policies at both national and international levels.

However, empirical evidence presents a more nuanced picture. Lu and Wang (2021) found that in countries with high government efficiency, firms tend to disclose less information, attributed to the presence of other effective institutional mechanisms that deter firms from additional CSR disclosure. Similarly, Baldini et al. (2018) observed that stronger legal frameworks are negatively associated with ESG disclosures, implying that firms in countries with stringent legal systems disclose less than those in countries with weaker legal systems. Interestingly, firms in developing nations, which often have the greatest negative impact on biodiversity, tend to provide more biodiversity disclosures to bridge the legitimacy gap (Ceballos et al., 2020). This aligns with legitimacy theory, which suggests that firms in weaker institutional environments may increase disclosures to legitimize their operations and align with societal expectations (Adler et al., 2018).

In the context of biodiversity, international agreements like CITES aim to protect endangered species by regulating or banning their trade. The effectiveness of CITES relies heavily on the enforcement of its regulations by national governments. Heid and

Márquez-Ramos (2023) demonstrate that CITES is effective in preserving wildlife primarily in countries with robust legal enforcement, underscoring the necessity of proper legal enforcement for the success of international environmental agreements. Effective enforcement is expected to prevent further species decline. However, if biodiversity continues to deteriorate, stricter trade regulations will necessitate even more robust legal systems. An unintended consequence of such enforcement could be an increase in illegal activities, disrupting MNE supply chains and productivity. Additionally, the COP 15 Global Biodiversity Framework targets require international cooperation and effective implementation to be successful. These targets necessitate that countries integrate COP 15 commitments into national laws and policies, ensuring robust legal systems and anti-corruption measures. However, the effectiveness of these policies faces significant challenges such as resource constraints, lack of political will, and the ability and willingness of member countries to implement regulations effectively. These challenges may explain the current state of biodiversity loss despite increased policy attention.

Given the significant financial implications of biodiversity loss, financial market regulators are increasingly focusing on this issue (Garel et al., 2024). The Taskforce on Nature-related Financial Disclosures (TNFD), established in 2021 and inspired by the Taskforce on Climate-related Financial Disclosures (TCFD), addresses this concern. The TNFD's recommendations, aligned with the Montreal Agreement's Target 15, cover governance, strategy, risk and impact management, and metrics and targets for nature-related dependencies and risks. Furthermore, regulations such as the EU Taxonomy's Environmental Objective 6 and the SFDR's Principle Adverse Impact (PAI) indicators, specifically PAI 7, require disclosures on activities negatively affecting biodiversity-sensitive areas (Garel et al., 2024). These frameworks demonstrate an increasing regulatory push towards biodiversity disclosures.

Legitimacy theory would predict that MNEs in countries with weaker institutions might provide more biodiversity disclosures to legitimize their impact on nature and prevent legitimacy gaps, striving to maintain their "social contract" with society (Adler et al., 2018). Weaker institutions are less likely to have stringent enforcement, political will, or willingness to implement regulations effectively, which could explain why firms in these environments seek to enhance their legitimacy through increased disclosures.

Despite the theoretical expectations, there is a lack of empirical evidence examining the effectiveness of strong legal systems on the biodiversity disclosures of MNEs. Understanding these dynamics is crucial for informing policy and practice. Based on the above discussion, our first hypothesis is:

H1: There is a negative relationship between the strength of the legal system in a country and the extent of biodiversity disclosure by MNEs.

3.2. Corruption

Previous research has demonstrated that the level of corruption within a country significantly influences a firm's disclosure practices (Baldini et al., 2018; Gerged et al., 2020). Institutional theory suggests that firms in less corrupt countries tend to provide higher

levels of disclosure in response to institutional pressures, reflecting ethical corporate behaviour. However, recent studies indicate that firms in countries with higher levels of corruption may disclose more information to project a positive image and gain societal legitimacy, thus obfuscating their negative impacts (Blanc et al., 2017). For instance, Baldini et al. (2018) observed a significant negative relationship between a firm's ESG disclosure and corruption. Similarly, Gerged et al. (2020) and Boubakri et al. (2021) found a negative relationship between corporate disclosure and corruption, implying that firms in less corrupt nations disclose less.

In the context of biodiversity disclosure, corruption significantly exacerbates the illicit wildlife trade, driving the biodiversity crisis. Institutional corruption is closely tied to illegal wildlife trafficking, facilitated by various forms of corruption such as bribery, document forgery, and complicity at both the firm and institutional levels (Lawson & Vines, 2014). Corruption within institutional contexts manifests through permit falsification, inspection evasion, and various forms of financial misconduct, involving individuals ranging from low-level employees to high-ranking officials (WWF, 2021). Empirical studies indicate a relation between governance quality and wildlife decline, underscoring the detrimental impact of corruption on biodiversity (Heid & Márquez-Ramos, 2023).

According to legitimacy theory, MNEs headquartered in highly corrupt environments may engage in increased disclosure to gain societal legitimacy and deflect attention from unfavourable activities. This strategy aims to present the firm as compliant with societal norms despite the corrupt context in which it operates. From an institutional perspective, countries with higher levels of corruption often lack robust legal frameworks and fail to effectively implement initiatives such as CITES and the SDGs, thereby hampering efforts to address biodiversity loss through regulatory measures. Moreover, in highly corrupt environments, the enforcement of international agreements like CITES is weakened, allowing illegal activities to thrive and further endangering biodiversity. These dynamics suggest that firms in such contexts might use increased disclosures as a means to appear more transparent and responsible than they are in reality, thereby attempting to mitigate the negative perceptions associated with operating in corrupt environments.

Given these complexities, it is crucial to understand the interplay between corruption and biodiversity disclosures. While firms in less corrupt environments might disclose more due to stronger institutional pressures and regulatory compliance, those in highly corrupt settings might also increase disclosures as a strategic maneuver to enhance their legitimacy and distract from their unethical practices. This leads us to our second hypothesis:

H2: There is a negative relationship between the level of corruption in a country and the extent of biodiversity disclosure by MNEs.

3.3. Culture

Hofstede's six cultural dimensions, as outlined by Hofstede et al. (2010), represent the most widely utilised framework in academic research to explore national cultural backgrounds. These dimensions encompass power distance, individualism versus collectivism, masculinity versus femininity, uncertainty avoidance, long-term versus short-term orientation, and indulgence versus restraint. Scholars extensively apply Hofstede's

framework across various literature domains, including sustainability and CSR performance (e.g. Halkos & Skouloudis, 2017; Kim & Kim, 2010; Lu & Wang, 2021).

3.3.1. Power distance

In countries with high power distance, hierarchy and respect for authority are paramount, leading individuals to accept established power structures without question (Boubakri et al., 2021; Lu & Wang, 2021). Conversely, countries with low power distance emphasise equality and encourage open discussions regardless of individuals' positions (Hofstede, 2011). Studies indicate that firms in low power distance countries tend to exhibit stronger environmental and CSR practices, conforming to institutional pressures (Cai et al., 2015; Lu & Wang, 2021). In high power distance countries, MNEs are likely to provide more biodiversity disclosures due to the hierarchical nature of their institutions. These firms may be compelled to comply with biodiversity initiatives and regulations to maintain legitimacy and meet institutional pressures such as the SDGs and CITES. Therefore, we hypothesise:

H3a: There is a positive relationship between high power distance culture and MNEs' biodiversity disclosure.

3.3.2. Individualism and collectivism

Individualism, as defined by Hofstede (2011), reflects the degree to which individuals in society prioritise individual freedom over collective interests. Nations with high individualism scores focus on the self, while those with lower scores emphasise collectivism (Lu & Wang, 2021). Studies show that countries high in individualism tend to have lower CO₂ emissions and better environmental performance, although some research suggests a negative association with CSR and environmental disclosure (DasGupta & Roy, 2023; Disli et al., 2016; Garcia-Sanchez et al., 2013).

In collectivist cultures, MNEs tend to prioritise the interests of their stakeholders. Biodiversity disclosure serves as a means for these firms to demonstrate their concern for environmental issues and gain societal legitimacy. To meet these expectations, maintain legitimacy, and signal responsible behaviour, MNEs may engage in biodiversity disclosure. Hence, we propose:

H3b: There is a positive relationship between collectivist culture and MNEs' biodiversity disclosure.

3.3.3. Masculinity and femininity

This cultural dimension refers to "the distribution of values between genders" (Hofstede, 2011, p. 12). Masculine cultures emphasise assertiveness, competitiveness, and recognition, while feminine cultures prioritise qualities like modesty, trust, and care (Boubakri et al., 2021). Prior studies have shown that feminine countries tend to exhibit better environmental performance and provide more CSR disclosure (Kim & Kim, 2010; Lu & Wang, 2021).

In the context of biodiversity disclosure, feminine cultures value quality of life and prioritise caring for others. Given the need to conserve and protect biodiversity, achieve the SDGs, and adhere to other global initiatives, countries with feminine cultures

may be more inclined to engage in biodiversity conservation efforts. This aligns with institutional theory, which suggests that cultural values can influence organisational behaviour. Thus, we hypothesise:

H3c: There is a positive relationship between feminine culture and MNEs' biodiversity disclosure.

3.3.4. Uncertainty avoidance

The cultural dimension of uncertainty avoidance refers to “the level of stress in a society in the face of an unknown future” (Hofstede, 2011, p. 10). Countries with low uncertainty avoidance have a relaxed attitude toward change and are more comfortable with uncertainty. Conversely, in countries with high uncertainty avoidance, individuals tend to avoid risk, resist change, and seek to minimise uncertainty through strict laws and regulations (Hofstede, 2011). These countries are likely to have well-defined biodiversity regulations and embed global policies such as CITES and COP 15 strategies into their legal systems. However, this may constrain innovation and hinder progressive strategies.

In the CSR literature, evidence on the relationship between uncertainty avoidance and CSR disclosure is mixed. Garcia-Sanchez et al. (2016) and Halkos and Skouloudis (2017) find a negative effect on CSR disclosure, while other studies show that firms in high uncertainty avoidance countries perform better environmentally (Disli et al., 2016; Kim & Kim, 2010; Lu & Wang, 2021). According to institutional theory, firms are expected to respond to institutional pressures to maintain corporate legitimacy. High uncertainty avoidance countries are likely to provide more biodiversity disclosure, recognising the threat to society from further biodiversity and species loss (Dasgupta, 2021). Therefore, we hypothesise:

H3d: There is a positive relationship between high uncertainty avoidance culture and MNEs' biodiversity disclosure.

3.3.5. Long-term and short-term orientation

The cultural dimension of long-term versus short-term orientation refers to whether individuals focus on the future, present, or past (Hofstede, 2011). Short-term oriented cultures highly regard their traditions and are proud of their national achievements, while long-term oriented cultures are willing to sacrifice present comforts for future benefits (Hofstede, 2011). These long-term oriented nations prioritise growth and prosperity (Boubakri et al., 2021). Research argues that firms with higher long-term orientation are more likely to invest in product innovation, leading to future profits, whereas short-term orientation impedes such progress by focusing on current and past realities.

Several studies have found that long-term oriented culture is positively associated with CSR disclosure (Halkos & Skouloudis, 2017; Lu & Wang, 2021). To address the biodiversity crisis, achieve the SDGs, and comply with long-term global policies such as CITES and the Kunming-Montreal Biodiversity Framework, nations must adopt a long-term perspective. This forward-looking approach enables them to set and achieve ambitious biodiversity strategies. Based on this discussion, we hypothesise:

H3e: There is a positive relationship between long-term oriented culture and MNEs' biodiversity disclosure.

3.3.6. Indulgence and restraint

Indulgence implies “relatively free gratification of basic and natural human desires related to enjoying life and having fun” (Hofstede, 2011, p. 16). Nations scoring high in indulgence have weaker control over impulses and prioritise enjoyment, while countries with low indulgence, or high restraint, exercise stronger control over impulses and adhere to stricter societal norms (Hofstede, 2011). Few empirical studies analyze the effects of this sixth cultural dimension. Disli et al. (2016) found that indulgent countries generate more carbon dioxide emissions due to a focus on human-driven fulfillment. In contrast, Halkos and Skouloudis (2017) found a positive relationship between indulgence and CSR disclosure, while Sun et al. (2019) observed that restrained countries are more environmentally concerned and provide more CSR disclosure.

To prevent further biodiversity loss, MNEs must suppress their demand on biodiversity and ecosystems. Overexploitation to meet consumer demands is a major driver of biodiversity decline. Therefore, MNEs need to curb their use of biodiversity to satisfy desires and avoid further depletion of ecosystems. In line with institutional theory, indulgent countries will need to comply with institutional pressures and adhere to strategies such as the SDGs to prevent further biodiversity decline. Therefore, we hypothesise:

H3f: There is a positive relationship between restraint culture and MNEs' biodiversity disclosure.

4. Data and methods

4.1. Sample selection

Prior studies indicate a slight increase in biodiversity reporting over time. Our study argues that biodiversity disclosures are pertinent to all firms in our sample as Fortune Global companies are widely recognised as leaders in sustainability reporting. According to KPMG (2022), 96% of these companies report on sustainability matters. Additionally, KPMG's review revealed that half of Fortune Global companies across various sectors disclose risks associated with biodiversity loss. This finding underscores the growing recognition of the heightened and pressing risk of biodiversity loss, which poses threats to businesses and their supply chains, thereby making biodiversity a focal point across all sectors. This assertion is further supported by numerous studies examining biodiversity reporting trends (e.g. Addison et al., 2018; Adler et al., 2018).

The importance of biodiversity becomes evident when considering that all economic products derive from biodiversity and nature throughout the value chain. Consequently, biodiversity loss can have severe impacts on both supply chains and business models, leading to disruptions in operations and strategic planning. While sectors such as mining, forestry, food, and tourism have a more direct reliance on biodiversity, other sectors such as retail, healthcare, and manufacturing also exhibit indirect dependencies. Furthermore, the financial sector is not immune to the impacts of biodiversity loss, facing potential consequences such as impacts on new markets, increased insurance claims, and reduced

returns on investments (Macellari et al., 2018). Forty-four observations were excluded due to the non-availability of English reports. Thus, our final sample consisted of 956 firm-year observations. Table 1 provides the sample distribution by country and industry.

4.2. Variable measurement

The dependent variable is a firm's total score taken from a biodiversity index of twenty-one indicators from Hassan et al. (2020), combining prior literature, GRI, and SDG goals (Adler et al., 2018; Atkins et al., 2018). This approach builds on prior studies that are limited by their sole dependence on the GRI biodiversity standards to examine a firm's disclosure (e.g. Haque & Jones, 2020), which are criticised for inadequately addressing the biodiversity and extinction crisis (Gray & Milne, 2018). Therefore, we encapsulate information beyond the scope of the GRI indicators. The 21-item framework (see Appendix 1) combines existing biodiversity GRI indicators with SDG 14 and SDG 15, which focus on biodiversity. It also includes items on biodiversity partnerships, policies and strategies for biodiversity or species protection, afforestation activities, restoration projects, and any biodiversity or species loss due to operations, including fines.

The weighted scoring method is adopted for disclosure, with a weight assigned to each item (Cho et al., 2015b). A stream of environmental research (e.g. Patten, 2002) follows Wiseman (1982), who assigned quantitative information a value of 3, qualitative information a value of 2, minimal information a value of 1, and no disclosure a value of 0. Valuing the impact on biodiversity in both qualitative and quantitative terms is required, but the quantitative metric facilitates measurable, comparable results across organisations and time periods with confidence (Dasgupta, 2021). Thus, this study follows Wiseman (1982), as it uniquely values quantitative information higher in

Table 1. Distribution of sample by sector and country.

Sector ID	Freq	Percent	Country ID	Freq	Percent
Aerospace & Defense	31	3.24	Australia	15	1.57
Apparel	3	0.31	Brazil	19	1.99
Chemicals	10	1.05	China	171	17.89
Energy	159	16.63	France	73	7.64
Engineering & Construction	24	2.51	Germany	80	8.37
Financial	235	24.58	India	5	0.52
Food, beverage & Tobacco	25	2.62	Italy	20	2.09
Food & Drug	53	5.54	Japan	94	9.83
Healthcare	46	4.81	Luxembourg	5	0.52
Household	10	1.05	Malaysia	5	0.52
Industrial	28	2.93	Mexico	8	0.84
Materials	19	1.99	Netherlands	20	2.09
Media	5	0.52	Norway	5	0.52
Motor vehicles & parts	77	8.05	Russia	19	1.99
Retail	34	3.56	Singapore	6	0.63
Technology	68	7.11	South Korea	24	2.51
Telecommunication	54	5.65	Spain	10	1.05
Transportation	23	2.41	Switzerland	25	2.62
Wholesaler	52	5.44	Taiwan	5	0.52
Total	956	100	Thailand	5	0.52
			UK	40	4.18
			USA	302	31.59
			Total	956	100

Freq = Frequency.

biodiversity literature. The maximum score for a firm-year observation is 63 (21×3). The dependent variable is calculated by dividing the total score by the maximum score and then converting it to a percentage. A manual content analysis is employed to capture all relevant information as most of the required information for the biodiversity disclosure index is not available from databases. The researcher manually coded the data. To ensure the reliability of coding over time, the test-retest method was conducted on a sample of the same content to ensure coding stability by the researcher. Appendix 2 shows examples of biodiversity disclosures.

Drawing on prior literature to deal with expected endogeneities, a series of control variables are included. At a firm level, we include the board-level CSR committee (*CSR*) as it may influence biodiversity disclosure (Haque & Jones, 2020; Lu & Wang, 2021). Partnerships with biodiversity partner groups and self-reported environmental fines (*SelfFines*) may also drive an MNE's biodiversity disclosure (Adler et al., 2018). We also use several financial characteristics as control variables by following related empirical studies (e.g. Elamer et al., 2017; Haque & Jones, 2020). These include return on assets (*ROA*), firm size (*Size*), and firm leverage (*Leverage*). Finally, country-level GDP (*GDP*) is included (e.g. Benlemlih & Yavaş, 2023; Ghoual et al., 2017). Refinitiv was used to access the Worldscope and ASSET4 databases to collect other variables. Panel A of Table 2 provides a description of the dependent variable, and Panel B of Table 2 provides the definition and source for all independent and control variables included in the study.

4.3. Empirical model

The following equations were developed to test the hypotheses related to the relationship between a firm's biodiversity disclosure and external governance mechanisms. Equation one tests hypotheses H1 and H2. Equation two tests hypotheses H3a, H3b, H3c, H3d, H3e and H3f. The regression models are as follows:

$$\begin{aligned}
 BD_{it} = & \beta_{0it} + \beta_1 Legal_{it} + \beta_2 CPI_{it} + \beta_3 GOV_{it} + \beta_4 GDP_{it} + \beta_5 SelfFine_{it} + \beta_6 Partner_{it} \\
 & + \beta_7 CSR_{it} + \beta_8 Size_{it} + \beta_9 ROA_{it} + \beta_{10} Leverage_{it} + YearFixedEffect \\
 & + SectorFixedEffect + FirmFixedEffect + \varepsilon
 \end{aligned}
 \tag{1}$$

$$\begin{aligned}
 BD_{it} = & \beta_{0it} + \beta_1 HofPD_{it} + \beta_2 HofIND_{it} + \beta_3 HofMAS_{it} + \beta_4 HofUAV_{it} + \beta_5 HofLTO_{it} \\
 & + \beta_6 HofINDUL_{it} + \beta_7 GDP_{it} + \beta_8 SelfFine_{it} + \beta_9 Partner_{it} + \beta_{10} CSR_{it} + \beta_{11} Size_{it} \\
 & + \beta_{12} ROA_{it} + \beta_{13} Leverage_{it} + YearFixedEffect + SectorFixedEffect + \varepsilon
 \end{aligned}
 \tag{2}$$

In equation one, *BD* is a firm's biodiversity disclosure score of sample firm *i* in year *t*, *it* period indicators, β_0 the regression intercept, and ε the error term. In equation two, *BD* is a firm's biodiversity and extinction disclosure score of sample firm *i* in year *t*, with control variables remaining the same as equation one.

The study employs negative binomial regression to estimate our models, as the dependent variable is a discrete variable over a fixed period, which is over-dispersed (Yang et al., 2007). The regression models use year, sector, and firm fixed-effects to address the effect of unobservable or omitted variable bias and control for unobservable firm-

Table 2. Summary and definitions of study variables.

Variables	Description	Source
Panel A: Dependent variable		
BD	The total score of a multinational enterprise's biodiversity disclosure, evaluated based on 21 items each scored from 0 to 3, divided by 63 and multiplied by 100 to express as a percentage.	Hassan et al. (2020)
Panel B: Independent variables		
Legal	Law enforcement score. A score of 0-10, where 0 is highly corrupt, and 10 is very clean	(1998)
LegalS	Legal system and property rights. An index of quality of legal system and security of property rights. A score of 0–10 Higher values imply a better legal system. The subcomponents are: (1) Judicial independence reliability of police; (2) Protection of property rights; (3) Impartial courts; (4) Military interference in rule of Law and politics; (5) Integrity of legal system; (6) Legal enforcement of contracts; (7) Reliability of police; (8) Business costs of crime; (9) regularity restrictions of the sale of real property	Fraser Institute's Economic Freedom of the World
CPI	Corruption Perceptions Index. A score of 0-100, where 0 is highly corrupt, and 100 is very clean	Perception Index
CC	Country level corruption score	World Governance Indicator (WGI)
GOV	The sum of the six dimensions of WGI voice and accountability, political stability, government effectiveness, regularity quality, rule of law, control of corruption	(2011)
HofPD	Power distance	Hofstede Cultural Database (2011)
HofIND	Individualism	
HofMAS	Masculinity	
HofUAV	Uncertainty avoidance	
HofLTO	Long-term orientation	
HofINDUL	Indulgence	
PD_TK	Revised Hofstede dimension of power distance	
IND_TK	Revised Hofstede dimension of individualism	
MAS_TK	Revised Hofstede dimension of masculinity	
UAV_TK	Revised Hofstede dimension of uncertainty avoidance	
LTO_TK	Revised Hofstede dimension of long-term avoidance	Tang and Koveos (2008)
Panel C: Control variables		
CSR	Dummy variable with a value of 1 if firms have a board CSR Committee and 0 otherwise	ASSET4 World Bank
GDP	GDP annual growth percentage	
SelfFine	Dummy variable with a value of 1 if firm reports on environmental fine, 0 otherwise	
Partner	Dummy variable equal to 1 if firm reports on biodiversity partnership, 0 otherwise	
Size	Natural logarithm of total assets for firm <i>i</i> in year <i>t</i> WCO2999	Worldscope
Leverage	Measured by total debt divided by total assets. WCO3255/WCO3501	Worldscope
ROA	Return on assets measured by operating income divided by total assets. WCO1250/WCO2999	Worldscope

specific heterogeneities among countries over time, which standard regression may not identify (Gerged et al., 2020).

5. Results

5.1. Descriptive statistics

Thirty-seven percent of the sample failed to make any disclosure, highlighting that some of the world's leading firms do not recognise the importance of the biodiversity

Table 3. Descriptive results.

Variable	<i>n</i>	Mean	SD	Min	Max
BD	956	6.9 (11%)	15.23	0	52 (82%)
Legal	756	9.1	0.89	5.93	10
CPI	956	64.39	16.50	4	87
GOV	956	0.850	0.76	-1.61	1.83
HofPD	956	53	18.03	31	100
HofIND	956	62	28.07	17	91
HofMAS	956	62	15.79	8	95
HofUAV	956	56	21.83	8	95
HofLTO	956	58	27.09	21	100
HofINDUL	956	50	18.31	20	97
GDP	956	1.73	3.53	-10.8	8.2
SelfFine	956	0.10	0.30	0	1
Partner	956	0.27	0.45	0	1
CSR	956	0.58	0.49	0	1
Size	954	19.73	2.46	9.74	26.64
ROA	946	2.56	51.93	-0.11	1519.6
Leverage	946	34.51	994.1	0.00	30564.6

n = sample size; SD = standard deviation; Min = minimum score; Max = maximum score.

Note: See Table 2 for the definitions of each variable.

crisis. This shows improvement compared to Hassan et al. (2020), as we focus specifically on biodiversity disclosures present in annual reports. Table 3 presents the summary statistics of all variables in the main regression analysis. The maximum biodiversity score (*BD*) is 52 (82%) out of a possible 63, with a mean of 6.9 (11%). This result implies the average score of a firm is relatively low, consistent with prior empirical studies that find disclosure to be low, minimalistic, and vague (Bhattacharyya & Yang, 2019; Rimmel & Jonäll, 2013). The six Hofstede (2011) cultural dimensions of the study have average scores of 53, 62, 62, 56, 58, and 50, respectively. The average country-level legal (*Legal*) score of the sample is around 9.1, and the corruption (*CPI*) score is around 64.

5.2. Correlation matrix

Table 4 provides the Pearson correlation matrix of all variables used in the main regression analysis. It shows that biodiversity disclosure (*BD*) is positively correlated with cultural dimension uncertainty avoidance (*HofUAV*), CSR committees (*CSR*), partnerships (*Partner*), and company size (*Size*), and negatively correlated with GDP growth (*GDP*), which is consistent with previous research (Baldini et al., 2018; Lu & Wang, 2021). Similar to prior cultural research (Boubakri et al., 2021; Lu & Wang, 2021), Table 3 shows high correlation among the cultural dimensions suggesting multicollinearity issues, therefore, to avoid this risk, each dimension was regressed individually in separate models. Similarly, the variables legal (*Legal*), corruption (*CPI*), and governance (*GOV*) are regressed separately to avoid any problems.²

²The variables ROA and Leverage were orthogonalized due to high correlation.

Table 4. Pairwise correlation matrix.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) BD	1.00																
(2) Legal	-0.21*	1.00															
(3) CPI	-0.03	0.84*	1.00														
(4) GOV	0.00	0.82*	0.94*	1.00													
(5) HofPD	0.06	-0.67*	-0.84*	-0.84*	1.00												
(6) HofIND	-0.06	0.66*	0.72*	0.74*	-0.83*	1.00											
(7) HofMAS	-0.05	0.25*	0.08*	0.08*	-0.09*	-0.10*	1.00										
(8) HofUAV	0.28*	-0.35*	0.21*	0.28*	-0.02	-0.01	0.05	1.00									
(9) HofITO	0.05	-0.15*	-0.34*	-0.37*	0.52*	-0.80*	0.21*	0.25*	1.00								
(10) HofINDUL	-0.01	0.34*	0.63*	0.65*	-0.71*	0.83*	-0.11*	-0.07*	-0.85*	1.00							
(11) GDP	-0.18*	0.05	-0.41*	-0.44*	0.40*	-0.44*	0.12*	-0.44*	0.24*	-0.36*	1.00						
(12) SelfFine	0.14*	0.06	0.09*	0.09*	-0.09*	0.17*	-0.08*	0.03	-0.15*	0.15*	0.01	1.00					
(13) Partner	0.62*	0.00	0.12*	0.13*	-0.08*	0.10*	-0.07*	0.18*	-0.06	0.13*	-0.18*	0.16*	1.00				
(14) CSR	0.11*	0.01	0.31*	0.33*	-0.29*	0.25*	0.05	0.25*	-0.12*	0.23*	0.04	0.25*	0.15*	1.00			
(15) Size	0.15*	-0.36*	-0.15*	-0.14*	0.23*	-0.37*	0.20*	0.44*	0.39*	-0.29*	-0.03	-0.06	0.01	0.15*	1.00		
(16) oROA	0.01	0.03	0.03	0.02	-0.02	0.01	-0.10*	-0.01	0.02	0.02	0.02	-0.01	0.05	-0.05	-0.16*	1.00	
(17) oLeverage	-0.06	-0.09*	-0.13*	-0.14*	0.12*	-0.12*	0.02	-0.06	0.08*	-0.12*	0.09*	-0.03	-0.06	-0.09*	-0.10*	0.00	1.00

Note: See Table 2 for the definitions of each variable. The above table represents regression coefficients and *t* statistics in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

5.3. Empirical results

5.3.1. Results of legal environment and corruption

Our results (see Table 5) support Hypothesis 1, indicating that MNEs headquartered in countries with stronger legal environments provide less biodiversity disclosure. This aligns with prior empirical studies suggesting that other institutional factors may take precedence (e.g. Baldini et al., 2018; Lu & Wang, 2021). In contrast, MNEs in weaker legal environments may provide more biodiversity disclosure to legitimize their negative behaviours and reduce scrutiny (Patten, 2002). This suggests that MNEs in such countries disclose more to deflect from exploitative activities, facing less regulatory pressure. This supports the argument that firms in weaker legal environments may engage in unethical behaviour such as illegal wildlife trade and wildlife crime (Atkins et al., 2018; Ceballos et al., 2020). These findings highlight that current policies, such as CITES, may not be effective enough, underscoring the urgent need for stronger legal regulations to protect biodiversity. Extensive disclosure can also serve as a risk mitigation strategy, as these firms may face higher risks of being implicated in controversies. Thus, higher disclosure can help pre-empt potential backlash or regulatory crackdowns. Therefore, caution should be taken as disclosure may be used as a greenwashing or legitimising strategy (Rimmel & Jonäll, 2013).

Hypothesis 2 is empirically supported, indicating that MNEs in highly corrupt institutions are likely to provide more disclosure, potentially to legitimize their activities and respond to institutional pressures (Baldini et al., 2018). These findings suggest that MNEs in corrupt countries use disclosure to portray a positive image, aligning with theoretical expectations (Boubakri et al., 2021; Gerged et al., 2020). The results highlight the critical issue of national corruption and its connection to unethical practices and illegal wildlife trade, which is a major driver of biodiversity loss, particularly in biodiversity-rich developing countries, undermining policy efforts such as CITES (Wyatt et al., 2018). The empirical evidence shows that MNEs in highly corrupt nations, often with weaker legal institutions, are motivated to disclose more about biodiversity, supporting literature linking institutional corruption to illegal wildlife trades (Lawson & Vines, 2014; Wyatt et al., 2018). As corruption can erode public trust, more biodiversity disclosure may be discharged to counteract negative perceptions and build credibility with stakeholders. Practically, these findings underscore the need for heightened political concern over wildlife corruption (Zain, 2020), with the COP 15 agreement offering an opportunity for policy and legislative resolutions. Without stringent anti-corruption measures, the destruction of biodiversity will continue, jeopardising the SDGs.

Additionally, the governance (GOV) variable supports H1 and H2, emphasising that MNEs in nations with stronger institutional frameworks provide less biodiversity disclosure. Analysis of firm-level control variables reveals that partnerships and company size are positively associated with biodiversity disclosure, while leverage has a negative effect, consistent with existing literature (Boubakri et al., 2021; Gerged et al., 2020).

5.3.2. Results of cultural dimensions

Table 6 presents the results for the cultural dimensions. Hypothesis 3a is empirically supported, indicating that MNEs in countries with high power distance provide more

Table 5. Negative binomial regression of the relationship of the impact of external governance on biodiversity disclosure.

BD	(1)	(2)	(3)
Legal	-0.230*** (-3.22)		
CPI		-0.008* (-1.69)	
GOV			-0.120 (-1.18)
GDP	-0.052 (-1.44)	-0.040 (-1.46)	-0.033 (-1.24)
SelfFine	-0.124 (-0.61)	-0.233 (-1.23)	-0.254 (-1.35)
Partner	1.370*** (11.64)	1.316*** (11.32)	1.314*** (11.23)
CSR	0.381* (1.80)	0.314* (1.81)	0.300* (1.72)
Size	0.087** (2.22)	0.093*** (2.71)	0.098*** (2.77)
oROA	-0.141** (-2.11)	-0.055 (-1.48)	-0.053 (-1.44)
oLeverage	-1.973*** (-2.74)	-0.986*** (-2.62)	-0.962** (-2.57)
_cons	1.159 (1.06)	-0.583 (-0.65)	-1.101 (-1.39)
Year FE	Included	Included	Included
Sector FE	Included	Included	Included
Firm FE	Included	Included	Included
<i>n</i>	706	869	869

n = sample size. Note: See Table 2 for the definitions of each variable. The above table represents regression coefficients and *t* statistics in parentheses.

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

biodiversity disclosures than MNEs in lower power distance countries. This finding contests prior studies (e.g. Boubakri et al., 2021; Cai et al., 2015). One interpretation of this result is that firms in high power distance countries may disclose more about biodiversity because they are less environmentally friendly, pursue their own interests, and operate within hierarchical structures. This increased disclosure may be a strategy to legitimize their operations and mask unethical activities (Cai et al., 2015; Lu & Wang, 2021). Theoretically, these firms might face external pressures and respond by providing biodiversity disclosure to comply with rules and expectations (DiMaggio & Powell, 1983; Haque & Jones, 2020). Additionally, high power distance is often associated with higher corruption due to a lack of cooperation and trust within an institution (Davis & Ruhe, 2003), which may also explain these findings. This relationship is further supported by equation one.

Hypothesis 3b is empirically supported, indicating that MNEs in collectivist countries provide a higher amount of biodiversity disclosure. This finding aligns with previous studies that have found a relationship between collectivist countries and CSR disclosure (Lu & Wang, 2021). Institutional theory explains that MNEs in collectivist nations face higher scrutiny and respond by disclosing more to maintain societal legitimacy and signal their efforts in addressing the biodiversity crisis through mimetic isomorphism (Haque & Jones, 2020). Additionally, Davis and Ruhe (2003) suggest that corruption is associated with collectivist societies, which may also support the findings of equation one.

**Table 6.** Negative binomial regression of the relationship of the impact of cultural dimensions on biodiversity disclosure.

BD	(1)	(2)	(3)	(4)	(5)	(6)
HofPD	0.012** (2.10)					
HofIND		-0.007* (-1.74)				
HofMAS			-0.002 (-0.47)			
HofUAV				0.009** (1.96)		
HofLTO					0.002 (0.53)	
HofINDJUL						
GDP	-0.042 (-1.57)	-0.047* (-1.65)	-0.016 (-0.64)	0.035 (1.05)	-0.019 (-0.74)	-0.004 (-0.80)
SelfFine	-0.258 (-1.33)	-0.196 (-1.08)	-0.259 (-1.40)	-0.238 (-1.33)	-0.244 (-1.35)	-0.025 (-0.92)
Partner	1.304*** (11.64)	1.322*** (11.33)	1.308*** (11.15)	1.299*** (11.45)	1.312*** (11.09)	-0.235 (-1.29)
CSR	0.396** (2.25)	0.325* (1.80)	0.257 (1.52)	0.267 (1.60)	0.267 (1.53)	1.328*** (11.09)
Size	0.071* (1.87)	0.058 (1.28)	0.114*** (3.17)	0.068* (1.81)	0.098** (2.51)	0.274 (1.57)
oROA	-0.061* (-1.67)	-0.066* (-1.75)	-0.051 (-1.39)	-0.059 (-1.63)	-0.054 (-1.45)	0.096** (2.57)
oLeverage	-1.004*** (-2.78)	-0.988*** (-2.71)	-0.914** (-2.48)	-0.893*** (-2.49)	-0.916** (-2.53)	-0.056 (-1.50)
_cons	-1.304* (-1.84)	0.110 (0.09)	-1.420** (-2.01)	-1.282* (-1.81)	-1.322* (-1.76)	-0.942*** (-2.60)
Year FE	Included	Included	Included	Included	Included	Included
Sector FE	Included	Included	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included	Included	Included
<i>n</i>	869	869	869	869	869	869

n = sample size. Note: See Table 2 for the definitions of each variable. The above table represents regression coefficients and *t* statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Hypothesis 3c is not statistically significant but suggests an association between biodiversity disclosures and feminine countries. Feminine nations are characterised by being more caring, empathetic, and valuing quality of life (Garcia-Sanchez et al., 2013; Lu & Wang, 2021). To address the biodiversity crisis and achieve initiatives such as the SDGs, a shift from anthropocentric to an eco-centric perspective is needed, which aligns with the qualities of feminine cultures. This supports the theoretical expectation that feminine countries conform to institutional pressures and perform better environmentally. Thus, this contributes to the academic debate on the impact of cultural dimensions on environmental performance.

Hypothesis 3d is empirically supported, indicating that MNEs in high uncertainty avoidance countries provide more biodiversity disclosure. This finding aligns with prior studies that have found a relationship between CSR disclosure and high uncertainty avoidance (Disli et al., 2016; Kim & Kim, 2010). High uncertainty avoidance countries create institutions to ensure security and minimise risk through policies and laws, leading MNEs to disclose biodiversity information to conform to institutional pressures (Tang & Koveos, 2008). Theoretically, this supports the institutional assumption of isomorphism, where firms comply with rules and expectations to maintain corporate legitimacy (DiMaggio & Powell, 1983; Haque & Ntim, 2018).

Hypothesis 3e is not statistically significant but suggests an association between long-term orientation and biodiversity disclosure. This implies that firms focused on long-term strategies are influenced by this cultural dimension to engage in future-oriented initiatives, such as the SDGs, to prevent biodiversity decline. This result aligns with existing CSR and environmental research (e.g. Halkos & Skouloudis, 2017; Lu & Wang, 2021). Institutional theory suggests that MNEs increase biodiversity disclosure to conform to societal pressures and expectations, addressing the biodiversity crisis and achieving the SDGs.

Hypothesis 3f suggests that MNEs in restrained institutions, which are perceived to be more environmentally concerned, provide more biodiversity disclosures, though this result is not statistically significant. This finding is consistent with prior studies showing a positive relationship between firms in restrained countries and CSR information (Lu & Wang, 2021; Sun et al., 2019). Institutional theory explains that MNEs in restrained nations conform to societal pressures, and these societies tend to be more environmentally conscious.

The results of the firm-level control variables indicate that board CSR committees, partnerships, and firm size are positively and significantly associated with biodiversity disclosure. This finding is consistent with the existing literature (Boubakri et al., 2021; Lu & Wang, 2021).

5.4. Robustness and additional analyses

5.4.1. Robustness

To ensure the rigour of our results, we re-ran both equations using Poisson regression, and the unrepresented results support the main analysis. Additionally, we changed the dependent variable from biodiversity score to the number of species disclosed by a firm, following Roberts et al. (2021). The unreported results also align with the main analysis, further validating our findings.

Table 7. Negative binomial with alternative measure for external governance.

BD	(1)	(2)	(3)
LegalS	-0.165** (-2.23)		
CC		-0.066 (-0.79)	
GOV			-0.120 (-1.18)
Control variables	Included	Included	Included
Year FE	Included	Included	Included
Sector FE	Included	Included	Included
Firm FE	Included	Included	Included
<i>n</i>	869	869	869

n = sample size. Note: See Table 2 for the definitions of each variable. This table presents the estimation results of biodiversity (*BD*) with an alternative measure of external governance for a countries legal framework (*LegalS*) and corruption (*CC*). Year controls are included. The above table represents regression coefficients and *t* statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.4.2. Alternative external governance measure

For equation one, we follow prior literature (Ghoul et al., 2017) by using an alternative measure of legal system (*LegalS*). Additionally, we use an alternative measure for corruption (*CC*) as suggested by prior studies (Cai et al., 2015). The results remain statistically significant, offering empirical support for the main analysis (see Table 7).

5.4.3. Alternative culture measures

Some studies question the validity of Hofstede's (2011) cultural dimensions, noting that they have remained unchanged over time (Schwartz, 1994). Boubakri et al. (2021) follow Tang and Koveos (2008), who provide an update to Hofstede's measures to reflect changing economic conditions. We implement these updated measures for additional analysis. Table 8 shows that the results for the alternative cultural dimensions remain statistically significant, supporting the main analysis.

5.4.4. Economic policy uncertainty

5.4.4.1. Economic policy uncertainty. Biodiversity loss is a pressing crisis, contributing to political and economic uncertainty globally. Macroeconomic stability and policy uncertainty can significantly impact corporate strategies, influencing how MNEs address environmental challenges. As environmental concerns have gained prominence on the global policy agenda, we focus on the macroeconomic factor of Economic Policy Uncertainty (EPU) Index³ by Baker et al. (2016). The index measures the frequency of keywords related to the economy, uncertainty, and regulatory issues in leading newspapers, providing insights into economic conditions and uncertainty levels.

Recent literature has begun exploring the significant impact of EPU on climate-related issues. For instance, Benlemlih and Yavaş (2023) find strong evidence that EPU increases firms' carbon dioxide (CO₂) emissions. Following prior literature (Galariotis & Karagiannis, 2021), the EPU index is aggregated on a monthly basis and then averaged annually to match our panel data frequency and normalise it. We split the sample into

³To examine economic uncertainty, we employ the Economic Policy Uncertainty (EPU) Index developed by Baker et al. (2016) source: <http://www.policyuncertainty.com>

Table 8. Negative binomial with alternative measures of cultural values.

BD	(1)	(2)	(3)	(4)	(5)
PD_TK	0.016*** (3.68)				
IND_TK		-0.013*** (-3.73)			
MAS_TK			0.006 (0.88)		
UAV_TK				0.016*** (2.99)	
LTO_TK					-0.000 (-0.06)
Control variables	Included	Included	Included	Included	Included
Year FE	Included	Included	Included	Included	Included
Sector FE	Included	Included	Included	Included	Included
Firm FE	Included	Included	Included	Included	Included

Note: See Table 2 for the definitions of each variable. This table presents the estimation results of biodiversity disclosure (BD) with an alternative measure of cultural dimensions. The above table represents regression coefficients and *t* statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

low and high EPU groups to examine its effect on biodiversity disclosure. Columns 1–4 of Table 9 demonstrate the impact of EPU on MNEs' biodiversity disclosure. Column 1 suggests that low economic uncertainty increases biodiversity disclosure of MNEs in weak legal institutions, while Column 3 indicates a similar effect in higher corrupt institutions. Despite low uncertainty, MNEs in weaker institutions may anticipate future regulatory changes, such as the Kunming-Montreal Biodiversity Framework aimed at biodiversity protections, therefore increasing disclosure to demonstrate proactive efforts to comply with anticipated regulations. Furthermore, they may comply with stakeholder pressures, including investors and financial groups, to address biodiversity concerns regardless of the current economic and political climate. Increased disclosure serves as a response to stakeholder demands, helping maintain or enhance the MNE's reputation and legitimacy.

In addition to the EPU Index, we also analyze the Energy-Related Uncertainty Index (EUI)⁴ by Dang et al. (2023), a more recent environmental macroeconomic measure. This index, akin to the EPU, assesses energy uncertainty at the country level. We calculate the yearly average of the monthly EUI and divide the sample into low and high EUI groups to investigate its impact on biodiversity disclosure. Columns 5–8 of Table 9 present the effect of EUI on MNEs' biodiversity disclosure. The results reveal that energy uncertainty significantly influences MNEs' biodiversity disclosure, particularly in weak legal institutions when uncertainty is low. Moreover, in countries with higher corruption levels, MNEs tend to provide increased biodiversity disclosure when energy uncertainty is high. This increase in biodiversity disclosure may serve as a strategic response to demonstrate compliance and mitigate potential regulatory risks during times of uncertainty. Moreover, it could help mitigate any reputational risks associated with corruption while signalling a commitment to addressing biodiversity concerns.

⁴To examine energy-related uncertainty, we employ the Energy-Related Uncertainty Index (EUI) developed by Dang et al. (2023) source: http://www.policyuncertainty.com/energy_uncertainty

Table 9. Regression effect of Economic Policy Uncertainty & Energy-Related Uncertainty on biodiversity disclosure.

	EPU				EUI			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Legal	-0.413*** (-2.95)	-0.703 (-1.26)			-0.598** (-2.29)	-0.320* (-1.86)		
CPI			-0.013 (-1.57)	0.040 (1.23)			-0.011 (-0.82)	-0.017* (-1.71)
Control	Included	Included	Included	Included	Included	Included	Included	Included
Year FE	Included	Included	Included	Included	Included	Included	Included	Included
<i>n</i>	473	41	585	51	178	476	243	568

n = sample size. The above table represents regression coefficients and *t* statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5.4.5. Exogenous shock of SDGs

As our study examines the period from 2012 to 2020, we investigate whether the introduction of the SDGs in 2015 moderates the relationship between biodiversity disclosure and the legal environment and corruption levels. The 17 SDGs are dedicated to sustainable development, with ecological goals 6 (water), 13 (climate), 14 (ocean), and 15 (land) being interlinked and influencing the achievement of other SDGs (Macellari et al., 2018). This examination is significant as stable ecosystems sustain healthy biodiversity, which provides essential services for human well-being, societal needs, and ultimately, supports economic and organisational sustainability (Table 10).

We recognise that the results could be driven by this exogenous shock. To assess this impact, we split the sample into pre-2015 and post-2015 periods. The post-SDGs results are statistically significant, implying that since the introduction in 2015, MNEs in institutions with stronger legal systems and lower corruption are disclosing less, while those in weaker institutions are disclosing more than they did pre-2015.

These results provide evidence that MNEs are responding to SDG pressures by increasing disclosure since their implementation. However, this suggests that the rationale for such disclosure may be insincere, as MNEs might be manipulating disclosures to create a favourable corporate image and reputation. Practically, this highlights the need for further regulation, as continued insincere reporting will hinder the achievement of the SDGs.

Table 10. Regression effect of external governance on biodiversity disclosure pre- and post- SDGs.

	Pre-SDGs		Post-SDGs	
BD	(1)	(2)	(3)	(4)
Legal	-0.265 (-1.60)		-0.570*** (-3.38)	
CPI		0.007 (0.67)		-0.018* (-1.85)
Control variables	Included	Included	Included	Included
Year FE	Included	Included	Included	Included
<i>n</i>	296	408	374	493

n = sample size. Note: See Table 2 for the definitions of each variable. The above table represents regression coefficients and *t* statistics in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

6. Conclusion

This study empirically examines the factors influencing biodiversity disclosures by MNEs, focusing on the role of external governance mechanisms. Using a cross-country sample of Fortune Global MNEs over five years, our analysis offers novel insights into how national legal systems, levels of corruption, and national culture significantly impact biodiversity disclosures. Our findings indicate that MNEs headquartered in countries with weaker legal systems and higher corruption levels provide more extensive biodiversity information than those in countries with stronger legal institutions and lower corruption. Additionally, the introduction of the SDGs in 2015 has moderated this relationship, leading to increased biodiversity disclosures post-implementation.

We distinctly explore the effect of macroeconomic uncertainty on biodiversity disclosures, specifically examining economic policy uncertainty and energy-related uncertainty. Our results demonstrate that macroeconomic uncertainty significantly influences MNEs' biodiversity disclosure practices. Overall, we offer novel insights into how external governance mechanisms and macroeconomic factors shape biodiversity disclosure, highlighting the complexity of biodiversity reporting in a global context. This study also examines the impact of national culture on biodiversity disclosures using Hofstede's (2011) cultural dimensions. Our results indicate that firms in countries with high power distance, collectivism, and high uncertainty avoidance are more motivated to disclose biodiversity information. While associations were found between MNEs in feminine, long-term oriented, and restrained countries, these were not statistically significant.

Our findings align with previous literature, suggesting that cultural dimensions are linked to levels of corruption, which influence reporting practices (Davis & Ruhe, 2003). The empirical evidence supports the theoretical construct that MNEs use biodiversity disclosure as a legitimising strategy to protect, maintain, and enhance their reputation, signalling responsiveness to institutional pressures (Haque & Jones, 2020). The robustness of our results is confirmed through various analyses, alternative proxies, subsample splits, and addressing endogeneity concerns, underscoring the reliability of our findings.

This study contributes to the emerging stream of biodiversity and extinction accounting literature by uniquely providing evidence-based insights into the relationship between biodiversity disclosures and external governance mechanisms. We identify that MNEs headquartered in countries with weaker legal systems and higher levels of corruption provide more disclosures. We also indicate that national culture is a significant factor influencing MNEs' biodiversity disclosures. Additionally, for the first time, we highlight that the unpredictability or instability of the broader economic environment impacts these disclosures. Specifically, economic and energy-related policy uncertainty emerge as new challenges in the realm of biodiversity reporting. Furthermore, we demonstrate that the introduction of the SDG initiatives motivates firms to provide more disclosure.

Our findings suggest that for global agreements such as CITES, COP 15, and the SDGs to be effective, national policies and goals must align with these principles, while institutions must be strengthened to combat corruption. Furthermore, as demands for natural capital to support consumer needs rise, there's an increasing necessity for a more circular approach to consumer products. Such an approach aims to relieve pressure on nature, with a shift towards circularity crucial for safeguarding biodiversity and ensuring the long-term health of species and ecosystems amidst the escalating exploitation of natural resources.

The current research makes a considerable impact as it contradicts the assumption that firms in more regulated environments with less corruption conform to expectations and institutional pressures and provide more reporting. Instead, we find the opposite to be true. These findings open the debate on the effectiveness of current governance mechanisms at both a firm and national level, casting doubt over the achievability of international policies and strategies if they are not embedded at the national level. The results of this study can offer critical insights for academics, policymakers, regulators, environmental groups, and broader stakeholders, urging them to design and implement transformative strategies to address the biodiversity crisis. The findings emphasise the urgent need for better regulations to protect wildlife and combat corruption, alongside the enforcement of stronger criminal justice measures. Interventions must be impactful and demand compliance from firms and institutions.

Several implications arise from this study. It is clear that immediate and profound transformative changes are necessary to avoid severe consequences for societal and economic well-being, which relies on healthy biodiversity. Stronger internal governance, reflecting cultural diversity, is essential for firms to lead efforts in halting the biodiversity crisis and meeting stakeholder expectations for nature conservation. Innovative corporate practices should focus on strategies and policies aligned with addressing corruption and illegal activities related to biodiversity. Initiatives such as employee awareness campaigns, robust whistleblowing mechanisms, anti-corruption teams, and supply chain due diligence can help mitigate risks. We recommend that future corporate strategy should include safeguarding whistle-blowers and the introduction of biodiversity compliance transparency statements akin to modern slavery statements to enhance transparency for stakeholders. Lastly, data holders must exert significant pressure on organisations failing to address the biodiversity and species extinction crisis. Environmental groups and business coalitions should continue advocating for more stringent regulation and holding non-compliant entities accountable.

This research contributes by suggesting future research directions. It does not take the view that MNEs exclusively engage in corruption; instead, it warrants further investigation to understand why firms in weaker legal environments with higher levels of corruption provide disclosure. A lack of reporting on fines or convictions related to biodiversity indicates firms may be failing to disclose negative behaviour and compensating with favourable disclosure. This suggests that without mandatory biodiversity reporting, firms may continue to be silent or use these impression management techniques. One possible explanation is that MNEs are not exclusively engaging in illicit activities; rather they may be inadvertently involved through supply chains or individuals at internal or external levels. This raises unanswered questions that would improve understanding of the empirical evidence:

- Does the firm have policies to investigate corruption or patronage misuse by employees, managers, and owners?
- Are firms intentionally engaging in unethical behaviour due to weaker legal environments?
- Has the firm conducted due diligence on supply chains for illegal activities?
- Is the firm aware of any internal or supply chain illicit or illegal activities?

This research has limitations, such as the sample being restricted to the top 200 companies. Future studies could expand the sample size or focus on specific sectors over longer periods. Additionally, investigating various forms of corruption and illegal activities within specific institutions warrants further exploration. While the study provides insights into macroeconomic policy interplay, future research should delve into macroeconomic mechanisms more deeply.

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Data availability statement

Data available on request from the authors.

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References

- Addison, P., Bull, J., & Milner-Gulland, A. (2018). Using conservation science to advance corporate biodiversity accountability. *Conservation Biology*, 33(2), 307–318.
- Adler, R., Mansi, M., & Pandey, R. (2018). Biodiversity and threatened species reporting by the top fortune global companies. *Accounting, Auditing and Accountability Journal*, 31(3), 787–825.
- Andersson, A. A., Tilley, H. B., Lau, W., Dudgeon, D., Bonebrake, T. C., & Dingle, C. (2021). CITES and beyond: Illuminating 20 years of global, legal wildlife trade. *Global Ecology and Conservation*, 26, e01455.
- Atkins, J., Doni, F., Gasperini, A., Artuso, S., la Torre, I., & Sorrentino, L. (2022). Exploring the effectiveness of sustainability measurement: Which ESG metrics will survive COVID-19? *Journal of Business Ethics*, 1, 1–18.
- Atkins, J., Maroun, W., Atkins, B. C., & Barone, E. (2018). From the Big five to the Big four? Exploring extinction accounting for the rhinoceros. *Accounting, Auditing & Accountability Journal*, 31(2), 674–702. <https://doi.org/10.1108/AAAJ-12-2015-2320>
- Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The Quarterly Journal of Economics*, 131(4), 1593–1636. <https://doi.org/10.1093/qje/qjw024>
- Baldini, M., Dal Maso, L., Liberatore, G., Mazzi, F., & Terzani, S. (2018). Role of country-and firm-level determinants in environmental, social, and governance disclosure. *Journal of Business Ethics*, 150(1), 79–98. <https://doi.org/10.1007/s10551-016-3139-1>
- Barkemeyer, R., Preuss, L., & Lee, L. (2015). December. Corporate reporting on corruption: An international comparison. *Accounting Forum*, 39(4), 349–365.
- Benlemlih, M., & Yavaş, ÇV. (2023). Economic policy uncertainty and climate change: Evidence from CO2 emission. *Journal of Business Ethics*, 1–27.

- Bhattacharyya, A., & Yang, H. (2019). Biodiversity disclosure in Australia: Effect of GRI and institutional factors. *Australasian Journal of Environmental Management*, 26(4), 347–369. <https://doi.org/10.1080/14486563.2019.1629544>
- Blanc, R., Islam, M. A., Patten, D. M., & Branco, M. C. (2017). Corporate anti-corruption disclosure: An examination of the impact of media exposure and country-level press freedom. *Accounting, Auditing & Accountability Journal*, 30(8), 1746–1770.
- Boubakri, N., Chkir, I., Saadi, S., & Zhu, H. (2021). Does national culture affect corporate innovation? International evidence. *Journal of Corporate Finance*, 66, 101847. <https://doi.org/10.1016/j.jcorpfin.2020.101847>
- Cai, Y., Pan, C. H., & Statman, M. (2015). Why do countries matter so much in corporate social performance? *Journal of Corporate Finance*, 41, 591–609. <https://doi.org/10.1016/j.jcorpfin.2016.09.004>
- CBD. (2022). Convention on Biological Diversity. *Nations adopt four goals, 23 Targets for 2030 in landmark UN biodiversity agreement*. <https://www.cbd.int/article/cop15-cbd-press-release-final-19dec2022>.
- Ceballos, G., Ehrlich, P. R., & Raven, P. H. (2020). Vertebrates on the brink as indicators of biological annihilation and the sixth mass extinction. *Proceedings of the National Academy of Sciences of the United States of America*, 117(24), 13596–13602. <https://doi.org/10.1073/pnas.1922686117>
- Cho, C. H., Laine, M., Roberts, R. W., & Rodrigue, M. (2015a). Organized hypocrisy, organizational façades, and sustainability reporting. *Accounting, Organizations and Society*, 40, 78–94. <https://doi.org/10.1016/j.aos.2014.12.003>
- CITES. (2024). *Convention on International Trade in Endangered Species of Wild Fauna and Flora*. <https://cites.org/eng>.
- Dang, T. H. N., Nguyen, C. P., Lee, G. S., Nguyen, B. Q., & Le, T. T. (2023). Measuring the energy-related uncertainty index. *Energy Economics*, 124, 106817. <https://doi.org/10.1016/j.eneco.2023.106817>
- Dasgupta, P. (2021). *The Economics of biodiversity: The Dasgupta review*. HM Treasury. <https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review>.
- DasGupta, R., & Roy, A. (2023). Moderation impact of national culture on international firm's environmental, social, governance and financial performance. *International Journal of Intercultural Relations*, 92, 101749. <https://doi.org/10.1016/j.ijintrel.2022.101749>
- Davis, J. H., & Ruhe, J. A. (2003). Perceptions of country corruption: Antecedents and outcomes. *Journal of Business Ethics*, 43(4), 275–288. <https://doi.org/10.1023/A:1023038901080>
- Deegan, C. (2002). Introduction: The legitimising effect of social and environmental disclosures - a theoretical foundation. *Accounting, Auditing & Accountability Journal*, 15(3), 282–311. <https://doi.org/10.1108/09513570210435852>
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review*, 48(2), 147–160. <https://doi.org/10.2307/2095101>
- Disli, M., Ng, A., & Askari, H. (2016). Culture, income, and CO2 emission. *Renewable and Sustainable Energy Reviews*, 62, 418–428. <https://doi.org/10.1016/j.rser.2016.04.053>
- Elamer, A. A., Ntim, C. G., & Abdou, H. A. (2017). Islamic Governance, National Governance, and bank risk management and disclosure in MENA countries. *Business & Society*, 59(5), 914–955.
- Gaia, S., & Jones, M. J. (2019). Biodiversity reporting for governmental organisations: Evidence from English local councils. *Accounting, Auditing and Accountability Journal*, 33(1), 1–31. <https://doi.org/10.1108/AAAJ-05-2018-3472>
- Galariotis, E., & Karagiannis, K. (2021). Cultural dimensions, economic policy uncertainty, and momentum investing: International evidence. *The European Journal of Finance*, 27(10), 976–993. <https://doi.org/10.1080/1351847X.2020.1782959>
- García-Sánchez, I. M., Cuadrado-Ballesteros, B., & Frias-Aceituno, J. V. (2016). Impact of the institutional macro context on the voluntary disclosure of CSR information. *Long Range Planning*, 49(1), 15–35. <https://doi.org/10.1016/j.lrp.2015.02.004>

- García-Sánchez, I. M., Rodríguez-Ariza, L., & Frías-Aceituno, J. V. (2013). The cultural system and integrated reporting. *International Business Review*, 22(5), 828–838. <https://doi.org/10.1016/j.ibusrev.2013.01.007>
- Garel, A., Romec, A., Sautner, Z., & Wagner, A. F. (2024). Do Investors Care about Biodiversity? *RReview of Finance*. rfae010.
- Gerged, A. M., Beddewela, E. S., & Cowton, C. J. (2020). Does the quality of country-level governance have an impact on corporate environmental disclosure? *Evidence from Gulf Cooperation Council Countries*. *International Journal of Finance & Economics*, 28(2), 1179–1200.
- Ghoul, S. E., Guedhami, O., & Kim, Y. (2017). Country-level institutions, firm value, and the role of corporate social responsibility initiatives. *Journal of International Business Studies*, 48(3), 360–385. <https://doi.org/10.1057/jibs.2016.4>
- Gray, R., Kouhy, R., & Lavers, S. (1995). Constructing a research database of social and environmental reporting by UK companies. *Accounting, Auditing & Accountability Journal*, 8(2), 78–101. <https://doi.org/10.1108/09513579510086812>
- Gray, R., & Milne, M. J. (2018). Perhaps the Dodo should have accounted for human beings? Accounts of humanity and (its) extinction. *Accounting, Auditing and Accountability Journal*, 31(3), 826–848. <https://doi.org/10.1108/AAAJ-03-2016-2483>
- Halkos, G., & Skouloudis, A. (2017). Revisiting the relationship between corporate social responsibility and national culture. *Management Decision*, 55(3), 595–613. <https://doi.org/10.1108/MD-12-2016-0868>
- Haque, F., & Jones, M. J. (2020). European firms' corporate biodiversity disclosures and board gender diversity from 2002 to 2016. *The British Accounting Review*, 52(2), 100893. <https://doi.org/10.1016/j.bar.2020.100893>
- Haque, F., & Ntim, C. G. (2018). Environmental policy, sustainable development, governance mechanisms and environmental performance. *Business Strategy and the Environment*, 27(3), 415–435. <https://doi.org/10.1002/bse.2007>
- Hassan, A. M., Roberts, L., & Atkins, J. (2020). Exploring factors relating to extinction disclosures: What motivates companies to report on biodiversity and species protection? *Business Strategy and the Environment*, 29(3), 1419–1436. <https://doi.org/10.1002/bse.2442>
- Heid, B., & Márquez-Ramos, L. (2023). International environmental agreements and imperfect enforcement: Evidence from CITES. *Journal of Environmental Economics and Management*, 118, 102784. <https://doi.org/10.1016/j.jeem.2023.102784>
- Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online Readings in Psychology and Culture*, 2(1), 8. <https://doi.org/10.9707/2307-0919.1014>
- Hofstede, G., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind* (3rd Ed). McGraw-Hill.
- Jones, M. J. (2019). Accounting for the environment: Towards a theoretical perspective for environmental accounting and reporting. *Accounting Forum*, 34(2), 123–138. <https://doi.org/10.1016/j.accfor.2010.03.001>
- Kaufmann, D., Kraay, A., & Mastruzzi, M. (2011). The worldwide governance indicators: Methodology and analytical issues. *Hague Journal on the Rule of Law*, 3(2), 220–246. <https://doi.org/10.1017/S1876404511200046>
- Kim, Y., & Kim, S. Y. (2010). The influence of cultural values on perceptions of corporate social responsibility: Application of Hofstede's dimensions to Korean public relations practitioners. *Journal of Business Ethics*, 91(4), 485–500. <https://doi.org/10.1007/s10551-009-0095-z>
- KPMG. (2022). Big shifts, small steps. Survey of Sustainability Reporting 2022. Available at: Global Survey of Sustainability Reporting 2022 - KPMG Singapore.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. *Journal of Political Economy*, 106(6), 1113–1155. <https://doi.org/10.1086/250042>
- Lawson, K., & Vines, A. (2014). *Global impacts of the illegal wildlife trade costs of crime, insecurity and institutional erosion*. Royal Institute of International Affairs.
- Lu, J., & Wang, J. (2021). Corporate governance, law, culture, environmental performance and CSR disclosure: A global perspective. *Journal of International Financial Markets, Institutions and Money*, 70, 101264. <https://doi.org/10.1016/j.intfin.2020.101264>

- Macellari, M., Gusmerotti, N. M., Frey, M., & Testa, F. (2018). Embedding biodiversity and ecosystem services in corporate sustainability: A strategy to enable sustainable development goals. *Business Strategy & Development*, 1(4), 244–255. <https://doi.org/10.1002/bsd2.34>
- Maroun, W., & Atkins, J. (2018). The emancipatory potential of extinction accounting: Exploring current practice in integrated reports. *Accounting Forum*, 42(1), 102–118. <https://doi.org/10.1016/j.accfor.2017.12.001>
- Patten, D. (2002). The relation between environmental performance and environmental disclosure: A research note. *Accounting, Organizations and Society*, 27(8), 763–773. [https://doi.org/10.1016/S0361-3682\(02\)00028-4](https://doi.org/10.1016/S0361-3682(02)00028-4)
- Prado-Lorenzo, J. M., & Garcia-Sanchez, I. M. (2010). The role of the board of directors in disseminating relevant information on greenhouse gases. *Journal of Business Ethics*, 97(3), 391–424. <https://doi.org/10.1007/s10551-010-0515-0>
- Rimmel, G., & Jonäll, K. (2013). Biodiversity reporting in Sweden: Corporate disclosure and preparers' views. *Accounting, Auditing & Accountability Journal*, 26(5), 746–778. <https://doi.org/10.1108/AAAJ-02-2013-1228>
- Roberts, L., Nandy, M., Hassan, A., Lodh, S., & Elamer, A. A. (2021). Corporate accountability towards species extinction protection: Insights from ecologically forward-thinking companies. *Journal of Business Ethics*, 1–25.
- Schwartz, S. (1994). *Beyond individualism/collectivism: New cultural dimensions of values*. Sage Publications, Inc.
- Skouloudis, A., Malesios, C., & Dimitrakopoulos, P. G. (2019). Corporate biodiversity accounting and reporting in mega-diverse countries: An examination of indicators disclosed in sustainability reports. *Ecological Indicators*, 98, 888–901. <https://doi.org/10.1016/j.ecolind.2018.11.060>
- Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3), 571–610. <https://doi.org/10.5465/amr.1995.9508080331>
- Sun, J., Yoo, S., Park, J., & Hayati, B. (2019). Indulgence versus restraint: The moderating role of cultural differences on the relationship between corporate social performance and corporate financial performance. *Journal of Global Marketing*, 32(2), 83–92. <https://doi.org/10.1080/08911762.2018.1464236>
- Talbot, D., & Boiral, O. (2021). Public organizations and biodiversity disclosure: Saving face to meet a legal obligation? *Business Strategy and the Environment*, 30(5), 2571–2586. <https://doi.org/10.1002/bse.2764>
- Tang, L., & Koveos, P. E. (2008). A framework to update Hofstede's cultural value indices: Economic dynamics and institutional stability. *Journal of International Business Studies*, 39(6), 1045–1063. <https://doi.org/10.1057/palgrave.jibs.8400399>
- WEF. (2022). *The World Economic Forum. The global risk report 2022*. <https://www.weforum.org/publications/global-risks-report-2022/>.
- Weir, K. (2019). The logics of biodiversity accounting in the UK public sector. *Accounting Forum*, 43(3), 348–379. <https://doi.org/10.1080/01559982.2019.1605873>
- Wiseman, J. (1982). An evaluation of environmental disclosures made in corporate annual reports. *Accounting, Organizations and Society*, 7(1), 53–63. [https://doi.org/10.1016/0361-3682\(82\)90025-3](https://doi.org/10.1016/0361-3682(82)90025-3)
- WWF. (2021). *What is biodiversity? Why it's under threat and why it matters*. <https://www.worldwildlife.org/pages/what-is-biodiversity>.
- Wyatt, T., Johnson, K., Hunter, L., George, R., & Gunter, R. (2018). Corruption and wildlife trafficking: Three case studies involving Asia. *Asian Journal of Criminology*, 13(1), 35–55. <https://doi.org/10.1007/s11417-017-9255-8>
- Yang, Z., Hardin, J. W., Addy, C. L., & Vuong, Q. H. (2007). Testing approaches for overdispersion in Poisson regression versus the generalized Poisson model. *Biometrical Journal: Journal of Mathematical Methods in Biosciences*, 49(4), 565–584.
- Zain, S. (2020). Corrupting Trade: An overview of corruption issues in illicit wildlife trade. *TRAFFIC*. <https://www.worldwildlife.org/pages/tnrc-introductory-overview-corrupting-trade-an-overview-of-corruption-issues-in-illicit-wildlife-trade#:~:text=Corruption%20facilitates%20all%20aspects%20of,specimens%20or%20evade%20law%20enforcement>.